

RESIDENTIAL STAIRWAYS and RAMPS

Code excerpts

R311.7 STAIRWAYS

R311.7.1 Width. Stairways shall not be less than 36 inches in clear width at all points above the permitted handrail height and below the required headroom height. Handrails shall not project more than 4.5 inches on either side of the stairway and the minimum clear width of the stairway at and below the handrail height, including treads and landings, shall not be less than 31.5 inches where a handrail is installed on one side and 27 inches where handrails are provided on both sides.

Exceptions:

1. The width of spiral stairways shall be in accordance with Section R311.7.10.1
2. The width of existing or replacement stairways serving existing unfinished attics or existing unfinished basements being converted to habitable space shall not be less than 32 inches in clear width at all points above the permitted handrail height and below the required headroom height. Handrails shall not project more than 4 inches on either side of the stairway and the minimum clear width of the stairway at and below the handrail height, including treads and landings, shall not be less than 28 inches where a handrail is installed on one side and 24 inches where handrails are provided on both sides.
3. Where an incline platform lift or stairway chairlift is installed on a stairway within a dwelling unit, a clear passage width of not less than 20 inches shall be provided. If the seat and platform can be folded when not in use, the distance shall be measured from the folded position.

R311.7.2 Headroom. The minimum headroom in all parts of the stairway shall not be less than 6 feet, 8 inches measured vertically from the sloped plane adjoining the tread nosing or from the floor surface of the landing or platform on that portion of the stairway.

Exception #1: Where the nosing of treads at the side of a flight extend under the edge of a floor opening through which the stair passes, the floor opening shall be allowed to project horizontally into the required headroom a maximum of 4 ¾ inches.

Exception #2: The minimum headroom in all parts of existing or replacement stairways serving existing unfinished attics or existing unfinished basements being converted to habitable space shall be 6 feet, 4 inches, measured as above.

R311.7.3 Vertical Rise. A flight of stairs shall not have a vertical rise larger than 147 inches between floor levels or landings.

R311.7.4 Walkline. The walkline across winder treads shall be concentric to the curved direction of travel through the turn and located 12 inches from the side where the treads are narrower.

R311.7.5.1 Risers. The maximum riser height shall be 8 ¼ inches. Riser height shall be measured vertically between leading edges of adjacent treads. The greatest riser height within any flight of stairs shall not exceed the smallest by more than 3/8 inch.

Exception: The maximum riser height of existing stairs serving existing unfinished attics or existing unfinished basements being converted to habitable space or replacement stairs where the pitch or slope cannot be reduced because of existing construction shall be 9 inches, measured as above.

R311.7.5.2 Treads. The minimum tread depth shall be 9 inches. The tread depth shall be measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's leading edge. The greatest tread depth within any flight of stairs shall not exceed the smallest by more than 3/8 inch.

Exception: The minimum tread depth of existing or replacement stairs serving existing unfinished attics or existing unfinished basements being converted to habitable space shall be 8 inches, measured as above.

R311.7.5.2.1 Winder Treads. Winder treads shall have a minimum tread depth of 10 inches measured between the vertical planes of the foremost projection of adjacent treads at the intersection with the walkline. Winder treads shall have a minimum tread depth of 6 inches at any point within the clear width of the stair. Within any flight of stairs, the largest winder tread depth at the walkline shall not exceed the smallest winder tread depth by more than 3/8". Consistently shaped winders at the walkline shall be allowed within the same flight of stairs as rectangular treads and do not have to be within 3/8" of the rectangular tread depth.

R311.7.5.3 Nosings. The radius of curvature at the nosing shall be no greater than 9/16 inch. A nosing not less than ¾ inch but not more than 1 ¼ inch shall be provided on stairways with solid risers. The greatest nosing projection shall not exceed the smallest nosing projection by more than 3/8 inch between two stories, including the nosing at the level of floors and landings.

Exception: A nosing is not required where the tread depth is a minimum of 11 inches.

R311.7.6 Landings for stairways. There shall be a floor or landing at the top and bottom of each stairway.

Exception: A floor or landing is not required at the top of an interior flight of stairs, including stairs in an enclosed garage, provided a door does not swing over the stairs.

R311.7.7 Stairway walking surface. The walking surface of treads and landings of stairways shall be sloped no steeper than one inch vertical in 48 inches horizontal (2 percent slope).

R311.7.8 Handrails. Handrails shall be provided on at least one side of each continuous run of treads or flight with four or more risers.

R311.7.8.1 Height. Handrail height, measured vertically from the sloped plane adjoining the tread nosing, or finish surface of ramp slope, shall be not less than 34 inches and not more than 38 inches.

Exceptions:

1. The use of a volute, turnout or starting casing shall be allowed over the lowest tread.
2. When handrail fittings or bendings are used to provide continuous transition between flights, transitions at winder

treads, the transition from handrail to guard, or used at the start of a flight, the handrail height at the fittings or bendings shall be permitted to exceed 38 inches.

R311.7.8.2 Continuity. Handrails for stairways shall be continuous for the full length of each flight, from a point directly above the top riser of the flight to a point directly above the lowest riser of the flight. Handrail ends shall be returned to a wall or shall terminate in newel posts or safety terminations. Handrails adjacent to a wall shall have a space of not less than 1 ½ inch between the wall and the handrails.

Exceptions:

1. Handrails shall be permitted to be interrupted by a newel post at the turn.
2. The use of a volute, turnout, starting easing or starting newel shall be permitted over the lowest tread.

R311.7.7.3 Grip size. All required handrails shall be of one of the following types or provide equivalent graspability.

1. Type I. Handrails with a circular cross section shall have an outside diameter of at least 1 ¼ inches and not greater than 2 inches. If the handrail is not circular it shall have a perimeter dimension of at least 4 inches and not greater than 6 ¼ inches with a maximum cross section of dimension of 2 ¼ inches.

2. Type II. Handrails with a perimeter greater than 6 ¼ inches shall provide a graspable finger recess area on both sides of the profile. The finger recess shall begin within a distance of ¾ inch measured vertically from the tallest portion of the profile and achieve a depth of at least 5/16 inch within 7/8 inch below the widest portion of the profile. This required depth shall continue for at least 3/8 inch to a level that is not less than 1 ¾ inches below the tallest portion of the profile. The minimum width of the handrail above the recess shall be 1 ¼ inches to a maximum of 2 ¾ inches. Edges shall have a minimum radius of 0.01 inch.

R311.7.9 Illumination. All stairs shall be provided with illumination in accordance with Section R303.7.

R311.7.10 Special stairways. Spiral stairways and bulkhead enclosure stairways shall comply with all requirements of Section R311.7 except as specified below.

R311.7.10.1 Spiral stairways. Spiral stairways are permitted, provided the minimum width at and below the handrail shall be 26 inches and the walkline radius is not greater than 24 ½ inches. Each tread shall have a depth of not less than 6 ¾ inches at the walkline. All treads shall be identical, and the rise shall be no more than 9 ½ inches. A minimum headroom of 6 feet 6 inches shall be provided.

R311.7.10.2 Bulkhead enclosure stairways. Stairways serving bulkhead enclosures, not part of the required building egress, providing access from the outside grade level to the basement shall be exempt from the requirements of Sections R311.3 and R311.7 where the maximum height from the basement finished floor level to grade adjacent to the stairway does not exceed 8 feet, and the grade level opening to the stairway is covered by a bulkhead enclosure with hinged doors or other approved means.

R311.8 RAMPS.

R311.8.1 Maximum slope. Ramps serving the egress door required by Section R311.2 shall have a maximum slope of 1 unit vertical in 12 units horizontal. All other ramps shall have a maximum slope of 1 unit vertical in 8 units horizontal.

Exception: Where it is technically infeasible to comply because of site constraints, ramps may have a maximum slope of 1 unit vertical in 8 units horizontal (12.5 percent slope).

R311.8.2 Landings required. There shall be a floor or landing at the top and bottom of each ramp, where doors open onto ramps, and where ramps change directions. The width of the landing perpendicular to the ramp shall be not less than 36 inches.

R311.8.3 Handrails required. Handrails shall be provided on at least one side of all ramps exceeding a slope of one unit vertical in 12 units horizontal (8.33 percent slope).

R311.8.3.1 Height. Handrail height, measured above the finished surface of the ramp slope, shall be not less than 34 inches and not more than 38 inches.

R311.8.3.2 Grip size. Handrails on ramps shall comply with Section R311.7.8.3.

R311.8.3.3 Continuity. Handrails where required on ramps shall be continuous for the full length of the ramp. Handrail ends shall be returned or shall terminate in newel posts or safety terminals. Handrails adjacent to a wall shall have a space of not less than 1 1/2 inches between the wall and the handrails.

R312 – GUARDS

R312.1 Where required. Guards shall be located along open-sided walking surfaces, including stairs, ramps and landings that are located more than 30 inches measured vertically to the floor or grade below at any point within 36 inches horizontally to the edge of the open side. Insect screening shall not be considered as a guard.

R312.1.2 Height Required guards at open-sided walking surfaces, including stairs, porches, balconies or landings, shall be not less than 36 inches in height.

R312.1.3 Opening limitations. Required guards shall not have openings from the walking surface to the required guard height which allows passage of a sphere 4 inches in diameter.

Exceptions:

1. The triangular openings at the open side of a stair formed by the riser, tread and bottom rail of a guard shall not allow passage of a sphere 6" in diameter.
2. Guards on open sides of stairs shall not have openings which allow passage of a sphere 4 3/8 inches in diameter.

NOTE: The entire 2018 State Building Code applies. These excerpts have been provided for your convenience.